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**\*\* WARNING \*\* WARNING \*\* WARNING \*\* WARNING \*\***

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October 27, 2005

04-SF-80-9.0/12.2  
04-0105U4

Addendum No. 2

Dear Contractor:

This addendum is being issued to the contract for construction on State highway in THE CITY AND COUNTY OF SAN FRANCISCO AT SAN FRANCISCO-OAKLAND BAY BRIDGE FROM WEST OF SAN FRANCISCO ANCHORAGE TO YERBA BUENA ANCHORAGE.

Submit bids for this work with the understanding and full consideration of this addendum. The revisions declared in this addendum are an essential part of the contract.

Bids for this work will be opened on November 9, 2005, instead of the date of November 2, 2005.

This addendum is being issued to set a new bid opening date as shown herein and revise the Notice to Contractors and Special Provisions.

In the Special Provisions, Section 5-1.15, "PAYMENTS," the second paragraph is revised as follows:

"For the purpose of making partial payments pursuant to Section 9-1.06, "Partial Payments," of the Standard Specifications, the amount set forth for the contract items of work hereinafter listed shall be deemed to be the maximum value of the contract item of work which will be recognized for progress payment purposes:

A. Water Pollution Control	\$18,750
B. Prepare Storm Water Pollution Prevention Plan	\$ 3,000
C. Progress Schedule (Critical Path Method)	\$ 5,000"

In the Special Provisions, Section 10-1.29, "POLYESTER CONCRETE OVERLAY," is revised as attached.

To Proposal and Contract book holders:

Inquiries or questions in regard to this addendum must be communicated as a bidder inquiry and must be made as noted in the NOTICE TO CONTRACTORS section of the Notice to Contractors and Special Provisions.

Indicate receipt of this addendum by filling in the number of this addendum in the space provided on the signature page of the proposal.

Submit bids in the Proposal and Contract book you now possess. Holders who have already mailed their book will be contacted to arrange for the return of their book.

Inform subcontractors and suppliers as necessary.

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This office is sending this addendum by confirmed facsimile to all book holders to ensure that each receives it. A copy of this addendum is available for the contractor's use on the Internet Site:

**[http://www.dot.ca.gov/hq/esc/oe/weekly\\_ads/addendum\\_page.html](http://www.dot.ca.gov/hq/esc/oe/weekly_ads/addendum_page.html)**

If you are not a Proposal and Contract book holder, but request a book to bid on this project, you must comply with the requirements of this letter before submitting your bid.

Sincerely,

ORIGINAL SIGNED BY

REBECCA D. HARNAGEL, Chief  
Office of Plans, Specifications & Estimates  
Office Engineer

Attachment

## **10-1.29 POLYESTER CONCRETE OVERLAY**

### **GENERAL**

This work shall consist of constructing a polyester concrete overlay, including application of a prime coat, in conformance with the details shown on the plans and these special provisions.

Before starting deck overlay work on the project, the Contractor shall submit for approval by the Engineer, a program for public safety associated with the use of methacrylate resin and polyester concrete during the construction of the project. This program shall identify materials, equipment, and methods to be used. Prior to the start of work, the Contractor shall provide verification of at least five years of experience successfully working with polyester concrete. The Contractor shall not perform any deck overlay work on the project, other than that specifically authorized in writing by the Engineer, until the program has been approved.

If the measures being taken by the Contractor are inadequate to provide for public safety associated with the use of methacrylate resin and polyester concrete, the Engineer will direct the Contractor to revise the operations and public safety program. These directions will be in writing and will specify the items of work for which the Contractor's program for public safety associated with the use of methacrylate resin and polyester concrete is inadequate. No further work shall be performed on these items until the public safety measures are adequate, and if required, a revised program for public safety associated with the use of methacrylate resin and polyester concrete has been approved.

The Engineer will notify the Contractor in writing of the approval or rejection of any submitted or revised program for public safety associated with the use of methacrylate resin and polyester concrete in not more than 10 working days following submittal.

The State will not be liable to the Contractor for failure to approve all or any portion of an originally submitted or revised program for public safety associated with the use of methacrylate resin and polyester concrete, nor for any delays to the work due to the Contractor's failure to submit an acceptable program for public safety associated with the use of methacrylate resin and polyester concrete.

A certified industrial hygienist shall furnish an airborne emissions monitoring plan. The emissions shall be monitored at a minimum of 4 points including the point of mixing, application, and the point of nearest public contact, as determined by the Engineer. At the completion of work, a report by the certified industrial hygienist with results of the airborne emissions monitoring plan shall be furnished to the Engineer. The airborne emissions monitoring work, including planning, monitoring, and reporting, performed by the certified industrial hygienist will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Surface preparation shall be as specified in "Prepare Concrete Bridge Deck Surface" of these special provisions.

When determined by the Engineer, the smoothness of existing concrete surfaces which are to be covered with polyester concrete overlay will be tested by the Engineer with a bridge profilograph in conformance with the provisions in Section 51-1.17, "Finish Bridge Decks," of the Standard Specifications. Conforming to the bridge profilograph test requirements on existing bridge decks will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

### **QUALITY CONTROL**

The Contractor shall designate in writing a Quality Control Manager (QCM). The QCM shall be responsible directly to the Contractor for the quality of the polyester concrete overlay operation, including materials and workmanship, performed by the Contractor and subcontractors.

The Engineer will have the authority to verify the qualifications or experience of the QCM.

The QCM shall be the sole individual responsible to the Contractor for submitting, receiving, reviewing, and approving all correspondence, required submittals, and reports to and from the Engineer.

The QCM shall not be employed or compensated by any subcontractor, or by other persons or entities hired by subcontractors, who will provide other services or materials for the project. The QCM may be an employee of the Contractor.

The QCM shall perform continuous inspection when any polyester concrete overlay work is being performed.

Inspection and approval of all polyester concrete overlay work shall be documented in writing by the QCM on a daily basis for each day.

### **POLYESTER CONCRETE OVERLAY PLACEMENT PLAN**

The Contractor shall submit to the Engineer working drawings of a polyester concrete overlay placement plan proposed for use on the bridge. Attention is directed to "Working Drawings" and "Maintaining Traffic" of these special provisions.

The placement plan shall be submitted within 10 working days after approval of the contract.

The placement plan shall include, but not be limited to, the following items:

- A. Description of all mixing and placing equipment
- B. Production rates of various operations
- C. Construction sequences and schedules
- D. Estimated length of polyester concrete overlay to be completed each shift.

The Contractor's placement plan shall also include a contingency plan, which includes one backup paving machine for a minimum of two paving machines, to be on-site during the polyester concrete overlay operations.

## **MATERIALS**

Polyester concrete shall consist of polyester resin binder and dry aggregate. The resin shall be an unsaturated isophthalic polyester-styrene co-polymer conforming to the following:

POLYESTER RESIN BINDER		
PROPERTY	REQUIREMENT	TEST METHOD
* Viscosity	0.075 to 0.200 Pa·s (RVT, No. 1 Spindle, 20 RPM at 25°C)	ASTM D 2196
* Specific Gravity	1.05 to 1.10 at 25°C	ASTM D 1475
Elongation	35 percent, minimum Type I at 11.5 mm/min. Thickness= 6.5±1 mm	ASTM D 638
	Sample Conditioning: 18/25/50 + 5/70	ASTM D 618
Tensile Strength	17.5 MPa, minimum Type I at 11.5 mm/min. Thickness= 6.5±1 mm	ASTM D 638
	Sample Conditioning: 18/25/50 + 5/70	ASTM D 618
* Styrene Content	40 percent to 50 percent (by weight)	ASTM D 2369
Silane Coupler	1.0 percent, minimum (by mass of polyester styrene resin)	
PCC Saturated Surface-Dry Bond Strength	3.5 MPa, minimum at 24 hours and 21±1°C	California Test 551
* Static Volatile Emission	60 gram per square meter, loss, maximum	South Coast Air Quality Management District, Standard Method
* Test shall be performed prior to adding initiator.		

The silane coupler shall be an organosilane ester, gammamethacryloxypropyltrimethoxysilane. The promoter shall be compatible with suitable methyl ethyl ketone peroxide (MEKP) and cumene hydroperoxide (CHP) initiators.

Aggregate for polyester concrete shall conform to the provisions in Section 90-2.02, "Aggregates," of the Standard Specifications and either of the following combined aggregate gradings:

COMBINED AGGREGATE		
Sieve Size	Percentage Passing	
	9.5-mm Max.	4.75-mm Max.
12.5-mm	100	100
9.5-mm	83 - 100	100
4.75-mm	65 - 82	62 - 85
2.36-mm	45 - 64	45 - 67
1.18-mm	27 - 48	29 - 50
600-µm	12 - 30	16 - 36
300-µm	6 - 17	5 - 20
150-µm	0 - 7	0 - 7
75-µm	0 - 3	0 - 3

Aggregate retained on the 2.36-mm sieve shall have a maximum of 45 percent crushed particles when tested in conformance with California Test 205. Fine aggregate shall consist of natural sand.

The polyester resin binder in the concrete shall be approximately 12 percent by mass of the dry aggregate; the exact percentage shall be determined by the Contractor.

The average of coarse and fine aggregate absorption shall not exceed one percent as determined by California Tests 206 and 207.

At the time of mixing with the resin, the moisture content of the aggregate, as determined by California Test 226, shall not exceed one half of the aggregate absorption.

The prepared surface shall receive a wax-free, low odor, high molecular weight methacrylate prime coat. The prime coat shall be a resin, and prior to adding initiator, the resin shall have a maximum volatile content of 30 percent when tested in conformance with the requirements in ASTM Designation: D 2369, and shall conform to the following:

High Molecular Weight Methacrylate (HMWM) Resin		
PROPERTY	REQUIREMENT	TEST METHOD
* Viscosity	0.025 Pa·s, maximum, (Brookfield RVT with UL adaptor, 50 RPM at 25°C)	ASTM D 2196
* Specific Gravity	0.90, minimum, at 25°C	ASTM D 1475
* Flash Point	82°C, minimum	ASTM D 3278
* Vapor Pressure	1.0 mm Hg, maximum, at 25°C	ASTM D 323
Tack-free time	400 minutes, maximum at 25°C	California Test 551
PCC Saturated Surface-Dry Bond Strength	3.5 MPa, minimum at 24 hours and 21±1°C	California Test 551
* Test shall be performed prior to adding initiator.		

The promoter/initiator system for the methacrylate resin shall consist of a metal drier and peroxide. If supplied separately from the resin, at no time shall the metal drier be mixed with the peroxide directly. The containers shall not be stored in a manner that will allow leakage or spillage from one material to contact the containers or material of the other.

A Material Safety Data Sheet shall be furnished prior to use for each shipment of polyester resin binder and high molecular weight methacrylate resin.

The Contractor shall allow 14 days for sampling and testing of the polyester resin binder and high molecular weight methacrylate resin prior to proposed use.

If bulk resin is to be used, the Contractor shall notify the Engineer in writing 10 days prior to the delivery of the bulk resin to the jobsite. Bulk resin is any resin that is stored in containers in excess of 209 liters.

### **TRIAL OVERLAY**

Prior to constructing the overlay, one or more trial overlays shall be placed on a previously constructed concrete base to determine the initial set time, to confirm that the specified rebound requirements are achieved, and to successfully demonstrate the effectiveness of the mixing, placing, and finishing equipment proposed. Each trial overlay shall be 3.6-m wide, at least 15.0-m long, and the same thickness as the overlay to be constructed. Conditions during the construction of the trial overlays and equipment used shall be similar to those expected and those to be used for the construction of the polyester concrete overlay.

The trial overlay site shall be located within 10 km of the project site and shall be approved by the Engineer.

The initial set time will be determined by using an initial-setting time Gillmore needle in conformance with the requirements in ASTM Designation: C 266. Accelerators or inhibitors may be required to achieve proper set times and shall be used as recommended by the resin supplier.

Within 2 hours of placement of the polyester concrete overlay, the trial overlay shall achieve an average reading of 24 on the rebound hammer in accordance with the requirements of ASTM Designation: C 805. Within 3 hours of placement of the polyester concrete overlay, the average rebound reading shall be 30. If the average rebound reading is below 30 at 3 hours, the trial overlay will be rejected, and one or more additional trial overlays will be required.

The Contractor shall hire and use an independent technician with a minimum of 3 years experience performing rebound testing, to perform the rebound test. Three rebound readings shall be taken for each trial overlay.

All materials used in the trial overlays, including the concrete base, shall become the property of the Contractor and shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Right of Way," of the Standard Specifications.

### **CONSTRUCTION**

The Contractor shall provide a rigid barrier between the polyester concrete overlay and the existing epoxy asphalt concrete overlay so that the polyester concrete overlay does not come into contact with the epoxy asphalt concrete overlay. The barrier shall be removed prior to placing the next paving pass of the polyester concrete overlay.

The Contractor shall be responsible for providing grade control for the polyester concrete overlay so as to control the accuracy necessary to ensure that the completed overlay conforms to the lines, grade, and minimum overlay thickness as shown on the plans, including making allowances for factors that may affect the lines and grades of the finished product.

Longitudinal joints in the polyester concrete overlay shall be located as shown on the plans.

The first two paving passes performed on both the upper and lower bridge decks shall be limited to a maximum of 45 meters in length.

A modified high alumina based concrete shall be used to repair the deck. When modified high alumina based concrete is placed prior to the deck overlay, the prime coat shall not be placed on the concrete until at least 30 minutes after final set.

Expansion joints shall be adequately isolated prior to overlaying as approved by the Engineer. Prior to applying the prime coat, the area to receive the prime coat shall be dry and blown clean by compressed air to remove accumulated dust and any other loose material. The surface temperature shall be at least 10°C and the relative humidity less than 85 percent when the prime coat is applied.

The prime coat shall be uniformly applied to completely cover the surface to receive the polyester concrete. The rate of spread shall be approximately 2.2 square meters per liter.

If the primed surface becomes contaminated, the contaminated area shall be cleaned by abrasive blasting and reprimed at the Contractor's expense.

Polyester concrete may be placed immediately after the prime coat has been applied.

A continuous mixer, employing an auger screw/chute device, shall be used. The continuous mixer shall 1) be equipped with a metering device that automatically measures and records the aggregate volumes and the corresponding resin volumes, and 2) have a readout gage, visible to the Engineer at all times, that displays the volumes being recorded. The volumes shall be recorded at no greater than 5 minute intervals along with the time and date of each recording. A printout of the recordings shall be furnished to the Engineer at the end of each workshift.

The resin binder shall be initiated and thoroughly blended just prior to mixing with aggregate. The polyester concrete shall be mixed a minimum of 2 minutes prior to placing.

Polyester concrete shall be placed prior to gelling and within 15 minutes following addition of initiator, whichever occurs first. Polyester concrete that is not placed within this time shall be discarded.

The surface temperature of the area to receive polyester concrete shall be the same as specified above for the prime coat. The finishing equipment used shall strike off the polyester concrete to the established grade and cross section. Finishing equipment shall be fitted with vibrators or other means of consolidating the polyester concrete to the required compaction.

The polyester concrete shall be consolidated to a relative compaction of not less than 97 percent in conformance with California Test 552.

The finished surface of the polyester concrete overlay shall conform to the provisions in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications and these special provisions.

Polyester concrete surfaces shall receive an abrasive sand finish. The sand shall be commercial quality blast sand conforming to the quality and dryness requirements for polyester concrete aggregate as specified in these special provisions. Ninety-five percent of the sand shall pass the 2.36-mm sieve, and 95 percent shall be retained on the 850- $\mu$ m sieve.

The sand finish shall be uniformly applied immediately after overlay strike-off and before gelling occurs to provide a minimum uniform coverage of 0.4-kilogram per square meter.

The surface texture of polyester concrete overlay surfaces shall be uniform and shall have a coefficient of friction of not less than 0.35 as measured by California Test 342. Portions of surfaces that do not meet the above provision shall be ground or grooved parallel to the centerline in conformance with the provisions of Section 42, "Groove and Grind Pavement," of the Standard Specifications until the above tolerance is met.

For each paving pass, two rebound test readings shall be taken, in accordance with ASTM Designation: C 805, for each 15-meter long section of overlay that is placed. The section of polyester concrete overlay represented by each two rebound tests shall achieve an average reading of 24 on the rebound hammer, within 2 hours after placement of said section. Within 3 hours of placement of said section, the average rebound reading shall be 30.

The QCM shall submit all test results, in writing, to the Engineer at the end of each shift.

For paving passes not completed, all leading (not trailing) and transverse edges shall be tapered to 45 degrees prior to placing equipment and traffic on the overlay.

Traffic and equipment shall not be permitted on the overlay for a minimum of 3 hours following final finishing. Overlays shall be protected from moisture for a minimum of 3 hours after finishing.

#### **MEASUREMENT AND PAYMENT**

Furnishing polyester concrete overlay will be measured by the cubic meter. The volume to be paid for will be determined from calculations based on the quantity of resin binder used and the yield of the specified mix design. The Contractor shall furnish suitable measuring devices to assure correct proportioning of materials and accurate measurements for calculating pay quantities. The pay quantity shall be the calculated quantity of polyester concrete overlay used in the work, exclusive of material used in trial overlays, and any wasted or unused material.

Placing polyester concrete overlay will be measured by the square meter. The area to be paid for will be based on the dimensions shown on the plans.

The contract price paid per cubic meter for furnish polyester concrete overlay shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing polyester concrete, including polyester resin binder, promoter/initiator, and aggregate, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract price paid per square meter for place polyester concrete overlay shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the polyester concrete overlay, complete in place, including grade control, application of prime coat, and furnishing, constructing, and disposing of trial overlays and base, grinding and grooving for skid resistance requirements, quality control requirements, and performing rebound tests and skid resistance tests, but excluding the airborne emissions monitoring work done by the certified industrial hygienist, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for compliance with the requirements for a program for public safety associated with use of methacrylate resin and polyester concrete shall be considered as included in the contract prices paid for the items of work involving polyester concrete overlay and no additional compensation will be allowed therefor.